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la demande de brevet  
européen spécifiée à la  
page suivante.

**Patentanmeldung Nr.    Patent application No.    Demande de brevet n°**

01102562.4

Der Präsident des Europäischen Patentamts;  
Im Auftrag

For the President of the European Patent Office

Le Président de l'Office européen des brevets  
p.o.

**I.L.C. HATTEN-HECKMAN**

DEN HAAG, DEN  
THE HAGUE,    04/09/01  
LA HAYE, LE

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**Blatt 2 der Bescheinigung**  
**Sheet 2 of the certificate**  
**Page 2 de l'attestation**

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Armonk, NY 10504  
UNITED STATES OF AMERICA

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Titre de l'invention:

A method, computer system and computer program product for processing customer loyalty data

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Etats contractants désignés lors du dépôt:

Bemerkungen:  
Remarks:  
Remarques:

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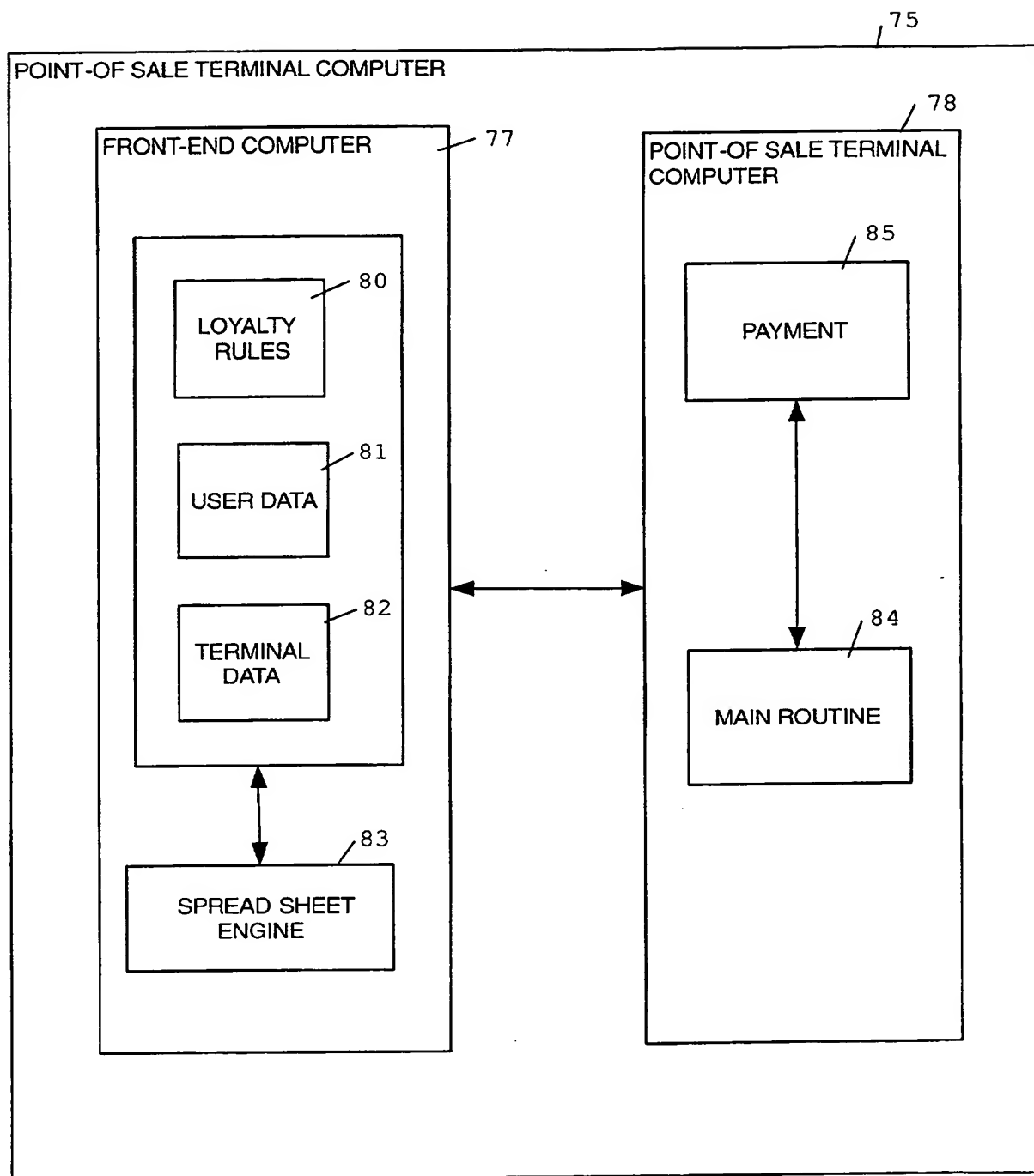


FIG. 7

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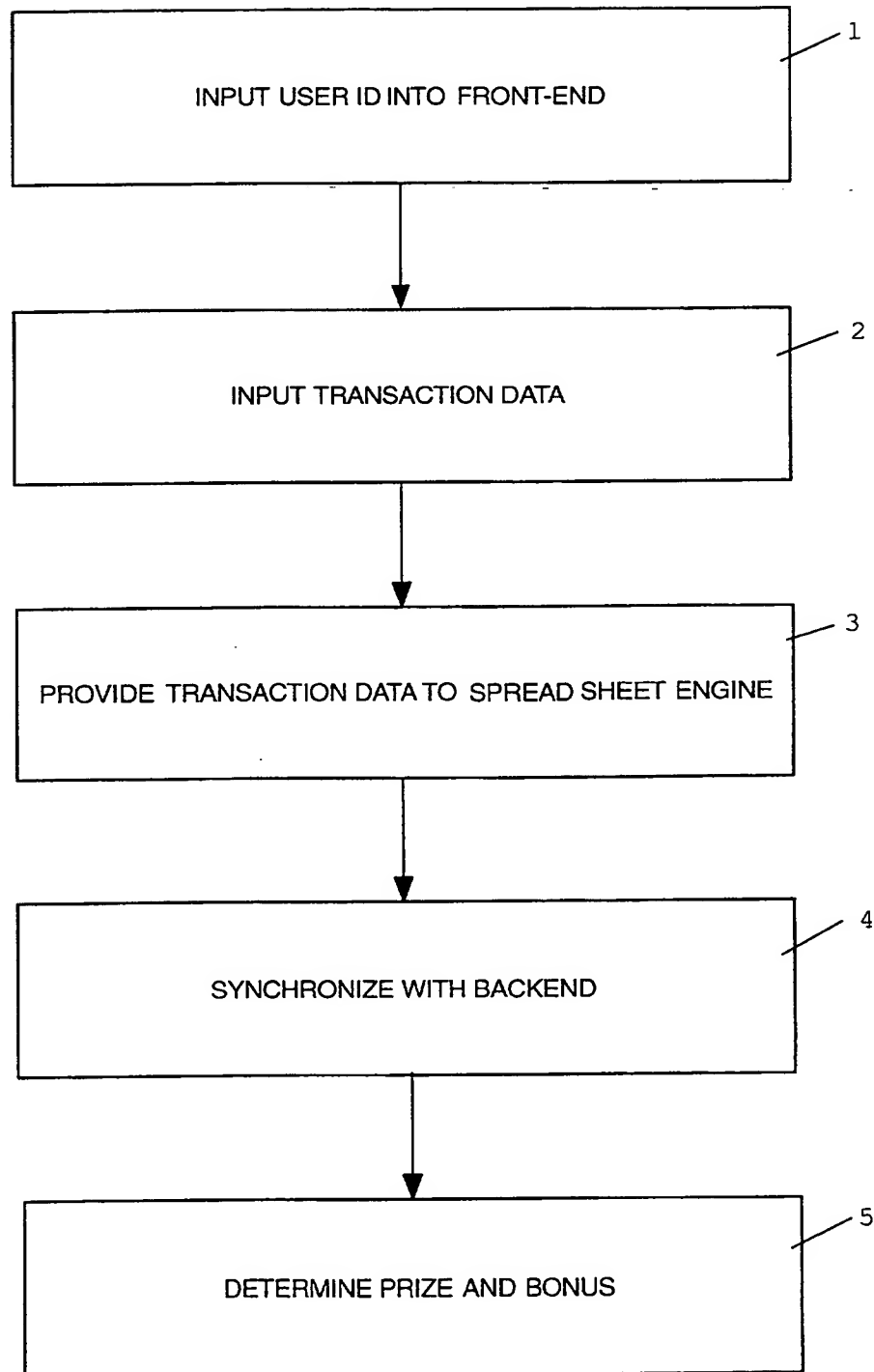


FIG. 8

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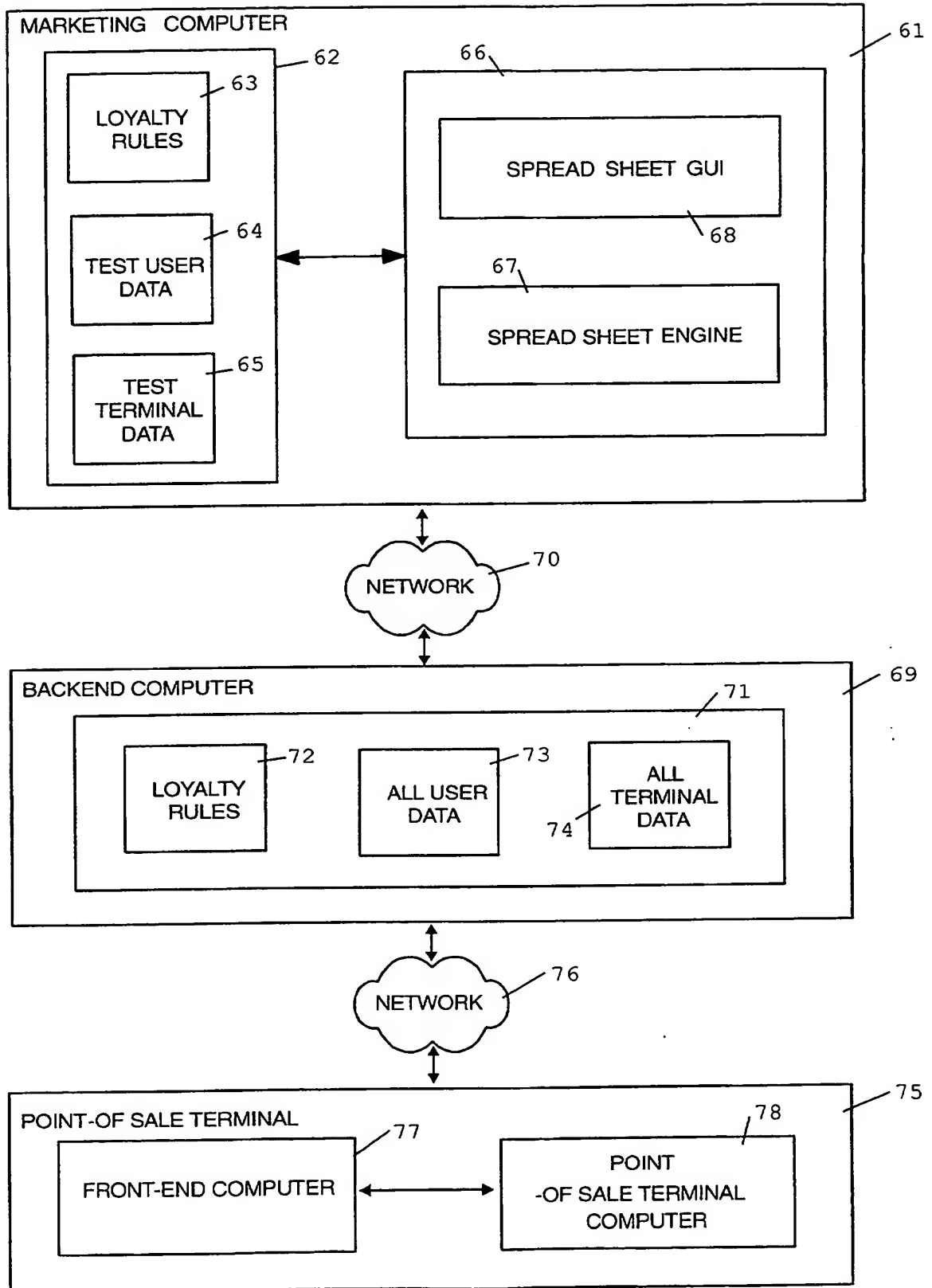


FIG. 6

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Lotus SmartSuite 1-2-3 - IF-SMART CARDPATENTSPREAD SHEETSPREAD SHEET BEISPIEL 991022 123
30

File Edit View Create Range Sheet Window Help

**BREWARD 4**

IF (DATE OF CONTRAC<1996/1/1#AND#POINTS THIS YEA<POINTS  
DIFFEREN" If you have 2000 Points in 99 you participate in a raffle "none")

Rewards		IF (DATE OF CONTRAC<1996/1/1#AND#POINTS THIS YEA<POINTS DIFFEREN" If you have 2000 Points in 99 you participate in a raffle "none")	
A	B	C	D
Tina Tuner	1	10 Extra Points	0
1701	4711	20 Extra Points	0
101	1999/11/02	none	1
600	Tuesday	If you have 2000 Points in 99 you participate in a raffle	0
1000			
1995/01/01			
female			
gold			
4			
Birthday			

FIG. 5



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30

Lotus SmartSuite 1-2-3 IF \SMART CARD\PATENTE\SPREAD SHEET\SPREAD SHEET

File Edit View Create Range Sheet Window Help

B REWARDZ @IF(B.GENDER="female"#AND#NUMBER OF SHOPS>2."20 Extra Points"."none")

Rewards Test User

B	A	B	C
1	Tina Tuner	1	10 Extra Points
2	1701	4711	20 Extra Points
3	101	1999/11/02	none
4	600	Tuesday	If you have 2000 Points in 99, you participate in a raffle
5	1000		
6	1995/01/01		
7	female		
8	gold		
9	4		
10	Birthday		

Anal 12/2/99 B 7 U No style General

FIG. 3

30

Lotus SmartSuite 1-2-3 IF \SMART CARD\PATENTE\SPREAD SHEET\SPREAD SHEET

File Edit View Create Range Sheet Window Help

Rewards Test User

B	A	B	C	D	E	F
1	Bill Boy	2	none	0		490
2	1710	0815	none	0		
3	0	1999/11/02	Small Christmaspresent	0		
4	1010	Tuesday	none	0		
5	700					
6	1997/01/01					
7	male					
8	silver					
9	0					
10	Birthday					

Anal 12/2/99 B 7 U No style General

FIG. 4



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**Abstract**EPO - Munich  
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A marketing computer 61, a backend computer 69 and a point-of-sale terminal 75 are interconnected by networks 70 and 76. After loyalty rules 63 of a customer loyalty program have been entered and tested in the marketing computer 61 the corresponding loyalty rules 72 and 77 are correspondingly updated. The front-end computer 77 can be a relatively inexpensive device as it does not require a graphical user interface.

(Fig. 6).

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- b) inputting of transaction data;
  - c) providing the transaction data to a spread sheet engine for processing of the transaction data in accordance with a loyalty rule; and
  - d) synchronizing the front-end computer device with a backend computer.
10. The method for performing a transaction further comprising the steps of:
- a) determining a price to be paid by a customer in accordance with the loyalty rule; and
  - b) displaying the price on the display of a point-of-sale terminal in accordance with claim 8.
11. A computer program product stored on a computer usable medium, comprising computer readable program means for causing a computer system to perform a method according to claim 9 or 10 when the program is run on the computer.

5. The computer system of anyone of the preceding claims further comprising marketing computer means (61) having a third database (62) for inputting and storing of loyalty rules (63) and test user data (64), a second spread sheet engine (67) having a graphical user interface (68), the marketing computer means and the backend computer means being coupled by a communications link (70) for updating the loyalty rules of the first database.
6. A front-end computer device having a database (79) for storing of loyalty rules (80) and for storing of user data (81) and a spread sheet engine (83) for entering and processing of transaction data of a user in accordance with the loyalty rules, the front-end computer device being adapted to be coupled with a backend computer device (69) via a communications link (76) to synchronize its database with a corresponding database (71) of the backend computer device.
7. The front-end computer device of claim 6 further comprising a communication module, such as a wireless communication module, the communications link preferably being a wireless link.
8. A point-of-sale terminal comprising a front-end computer device (77) according to claim 6 or 7 and having a computer program routine (84) for triggering the spread sheet engine and a payment application program (85).
9. A method for performing a transaction comprising the steps of:
  - a) inputting of data to identify a user into a front-end computer device according to claims 6 or 7;

## Claims

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1. A computer system comprising
  - a) backend computer means (69) having a first database (71) for storing of loyalty rules (72) and of user data (73);
  - b) front-end computer means (77) having a second database (79) for storing of loyalty rules (80) and for storing of user data (81) and a spread sheet engine (83) for entering and processing of transaction data of a user in accordance with the loyalty rules,

the backend computer means and the front-end computer means being adapted to be coupled by a communications link (76) for synchronization of the first and the second databases.
2. The computer system of claim 1 further comprising a point-of-sale terminal (75), the point-of-sale terminal being coupled to the front-end computer means.
3. The computer system of claim 2 the point-of-sale terminal having a computer program routine (84) for triggering the spread sheet engine and a payment application program (85).
4. The computer system of claim 2 or 3 the point-of-sale terminal and the front-end computer means being integrated into one device having a common display unit.



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## List of reference numerals

window	30
marketing computer	61
database	62
loyalty rules	63
test user data	64
test terminal data	65
spread sheet program	66
spread sheet engine	67
spread shut GUI	68
backend computer	69
network	70
database	71
loyalty rules	72
user data	73
terminal data	74
point-of-sale terminal	75
network	76
front-end computer	77
point-of sale terminal computer	78
database	79
loyalty rules	80
user data	81
terminal data	82
spread sheet engine	83
main routine	84
payment	85

A particular advantage of the invention is that it allows to perform the evaluation of an applicable loyalty rule 80 "on schedule" without a need of a further trigger. This feature can rely on the functionality of the spread sheet engine 83.

Furthermore it can be beneficial to define temporary fields in the spread sheet for a storage of intermediate results which are used more than once. For example in case that a rebate is provided to a customer if the customer has obtained more bonus points in the present year than in the last year, it saves processing time to determine the amount of bonus points of last year and to perform the comparison operation only once and to temporally save the corresponding data in a temporary field in the front-end computer until the current transaction has been completed.

front-end computer 77 to the main routine 84 of the point-of-sale terminal computer 78 for processing in its' payment module 85. The payment module 85 displays the actual price and carries out the transaction for receiving payment from the customer. The user data 81 is updated correspondingly if the customer receives bonus points for the purchase. The updated user data 81 is synchronized from time to time with the user data 73 of all users which is stored in the database 71 of the backend computer 69.

On the occasion of a synchronization of the databases 79 and 71 also the loyalty rules 80 in the front-end computer 77 are updated by loyalty rules 72 of the backend computer 69.

Fig. 8 shows a flow chart illustrating an embodiment of the method of the invention. In step 1 a user ID is inputted into the front-end computer. This can be done manually or by means of a smart card or other authentication means.

In step 2 transaction specific data is inputted detailing the good or service a customer desires to purchase. This transaction data is provided to the spread sheet engine in step 3 which accesses the user data of the user which desires to purchase the good or service including the purchase history of the user, as well as the set of loyalty rules of the applicable customer loyalty program. As a result the spread sheet engine updates the user data, for example by providing additional bonus points and storing the additional bonus points in the user profile.

In step 4 the front-end computer is synchronized with the backend computer to transfer updated user data to the backend and obtain updated loyalty rules from the backend, if any.

In step 5 the actual price is determined and outputted based on the up to date loyalty rules.

The backend computer 69 is coupled to a point-of-sale terminal 75 via network 76. The point-of-sale terminal 75 has a front-end computer 77 and a point-of-sale terminal computer 78.

The front-end computer 77 captures user and transaction data which are provided by means of a manual input operation, a customer card, such as a smart card, or similar devices. The front-end computer 77 has a copy of the loyalty rules and terminal data relating to the point-of-sale terminal 75 to which it belongs.

The front-end computer 77 is coupled to a point-of-sale terminal computer 78 for information exchange and control. In one embodiment an actual purchase price of a good which a customer desires to purchase is determined by the front-end computer 77 relying on the combination of loyalty rules and user data. The actual purchase price is provided by the front-end computer 77 to the point-of-sale terminal computer 78 for display of the actual price on a display of the point-of-sale terminal 75. The front-end computer 77 and point-of-sale terminal computer 78 can be integrated into the same physical unit or they can be realized by way of two separate devices.

Fig. 7 shows an enlarged view of the point-of-sale terminal 75. The front-end computer 77 has a database 79 for storage of loyalty rules 80, user data 81 and terminal data 82. Further the front-end computer 77 has a spread sheet engine 83 which can be a copy of the spread sheet engine 67. In order to keep the front-end computer simple a graphical user interface is not included such that front-end computer 77 only requires minimal data processing resources.

The point-of-sale terminal computer 78 has a main routine 84 and a payment module 85. The main routine 84 triggers the front-end computer 77 in case a purchase price is to be determined. After the determination of the purchase price based on the loyalty rule 80 and user data 81 the actual price is provided by the

The loyalty rules 63 can be of the type as explained with reference with Fig. 1 to 5. Likewise the test user data 64 can be of the type as shown in the columns A and C in the spread sheets of Fig. 1 to 5 describing a user's profile and history concerning the obtainment of bonus points, respectively. Likewise the test terminal data 65 can be of the type as shown in column B of the spread sheets shown in Fig. 1 to 5.

The database 62 interacts with a spread sheet program 66. The spread sheet program has spread sheet engine 67 and a spread sheet graphical user interface 68. The spread sheet engine 67 can be a kernel of any standard spread sheet program like Lotus SmartSuite or Microsoft Excel. One way of realizing the spread sheet graphical user interface 68 is by means of Microsoft Windows.

By means of the spread sheet graphical user interface 68 it is possible to visualize, modify, delete, update and enter loyalty rules 63 in the database 62. Modified loyalty rules 63 can be tested in the marketing computer 61 for coherence with prior loyalty rules and simulation and testing with test user data 64 and test terminal 65.

The marketing computer 61 is coupled to backend computer 69 via network 70. The backend computer 69 has a database 71 for storage of loyalty rules 72, user data 73 and terminal data 74. The data contained in the database 71 is the set of data relied on for the real life operation of the computer system. The loyalty rules 72, user data 73 and terminal data 74 are the data which are actually used for the processing of real customer and transaction data. In particular the loyalty rules 72 are updated from time to time by transferring of loyalty rules 63 from the marketing computer 61 to the backend computer 69 via network 70 to the database 71 after the loyalty rules 63 have been tested successfully and are to be introduced into the market.

It is also possible to modify a loyalty rule by entering a modification in the window 30 or by replacing the rule by a new one. Also additional rules can be entered into the window 30 and can thus be added to the set of loyalty rules of the customer loyalty program.

Fig. 4 shows a further example for a loyalty rule: "If a customer has obtained 'silver-status' in the loyalty program of the shopping mall and if he or she shops in the time interval between 15. October and 25. December than he or she obtains a small Christmas present. 'Silver-status' is obtained, if a customer has acquired more than one thousand bonus points in the preceding year." Again the corresponding loyalty rule is displayed in the window 30 and can be updated, modified or deleted.

Fig. 5. shows a further example of a loyalty rule: "If the customer participates in the loyalty program of the shopping mall since 1<sup>st</sup> January 1996 and if the number of loyalty bonus points acquired in the year 1999 is 30% below the bonus points acquired in the year 1998 the customer is informed that he or she will participate in a raffle of a cruise in the Caribbean provided that he or she will obtain at least 2000 bonus points in the current year." This rule is shown in the window 30.

For evaluating this rule a temporary field is used in the column F of the spread sheet for storing an intermediate value.

With reference to Fig. 6 now an embodiment of the computer system of the invention is explained in more detail. The computer system has a marketing computer 61 having a database 62 for storage of loyalty rules 63, test user data 64 and test terminal data 65.

Fig.7 shows a more detailed view of the point-of-sale terminal computer of the embodiment shown in Fig. 6; and

Fig. 8 shows an embodiment of a method for performing a transaction in accordance with the invention.

Fig. 1 illustrates by way of example the contents of test user data specifying a user profile. The test user profile is to be entered into column A of the spread sheet. In the example considered here the spread sheet program used is Lotus SmartSuite 1-2-3. However, any other spread sheet program such as Microsoft Excel can also be utilized.

Column B of the spread sheet shown in Fig. 1 holds a data record specifying test terminal data. Column C of the Spread sheet is used for storage of bonus points or rewards obtained by a corresponding user.

The spread sheet is displayed in a graphical user interface such as Microsoft Windows for convenient display and modification of data entries.

Fig. 2 shows an instance of a test user, corresponding test user data and test terminal data in the columns A, C and B, respectively. In the example considered here a customer obtains ten additional bonus points in the customer loyalty program if he or she purchases goods exceeding the amount of one hundred US Dollars in a single day.

In accordance with the example of Fig. 3 another loyalty rule of the loyalty system is as follows: "If a female customer buys goods in more than two different shops of a shopping mall, she obtains twenty additional bonus points in the loyalty program of the shopping mall". The corresponding loyalty rule is displayed in the field 30 of the spread sheet.



The front-end device advantageously can be integrated with a point-of-sale terminal for a processing of a customer's check out and payment. Furthermore the invention is advantageous in that it allows the updating of loyalty rules without a need to separately reprogram each of the front-end devices in the field. Changing of loyalty rules in the database of the backend computer will cause updating of the loyalty rules of the front-end devices when a synchronisation occurs.

It is a further advantage that the loyalty rules can be edited on a marketing computer using a graphical user interface. Testing can be performed on the marketing computer by usage of test user and test terminal data. After successful testing of a modified loyalty rule on the marketing computer the modified rule or the modified set of rules can be transferred to the loyalty rule database of the backend computer. From there the modified loyalty rules are further distributed to the front-end devices on the occasion of a synchronization.

#### **Brief description of the drawings**

The present invention together with the above and other objects and advantages may best be understood from the following detailed description of the preferred embodiment of the invention illustrated in the drawings, in which:

Fig. 1 - Fig. 5 show examples of a spread sheet engine with loyalty rules using a graphical user interface;

Fig. 6 shows a schematic block diagram of a computer system for processing of loyalty rules;

deposit account interest, are awarded to customers based on the Relationship scores. Management reports summarize the Relationships between the Bank and its customers and provide marketing information.

Further loyalty and incentive award programs using data processing and card systems are know from US 6,026,370 and US 5,025,372.

The present invention solves the problems associated with prior art data processing systems for processing of customer loyalty data by providing an improved computer system, front-end computer device, point-of-sale terminal, computer program product and method for implementation of a customer loyalty system. In brief the invention provides for front-end devices, such as front-end input terminals for inputting of transaction data, such as data specifying goods or services to be purchased by a customer. The front-end devices can be distributed in the field, for example in retail shops, super market and point-of-sale terminals. The front end devices have a spread sheet engine which comprises the data processing kernel of a spread sheet program such as Lotus SmartSuite or Microsoft Excel.

The invention is particularly beneficial in that it allows to operate the front-end device without a graphical user interface. This way the front-end device only requires minimal resources and can thus be implemented in an inexpensive way.

The front-end device has a database for storing of loyalty rules for access by its' spread sheet engine. Further the front-end device has a memory for storing of user data. When transaction data are inputted into the front-end device, the front-end device connects to a backend computer for synchronisation. The synchronisation can be done via a telephone line, a wireless communication path, the internet or an intranet. An appropriate schedule for a synchronisation can be one a day.

is periodically collected from the retail site to a data warehouse, where various types of analysis may be performed. A customer can interact with the system using an internet interface.

US 6,129,274 shows a system for updating shopping transaction history data using an electronic personal digital shopping assistant. This includes an electronic personal shopping system for communicating between a customer's personal memory store and point-of-sale terminals in a retail facility. Demographic profile data, a customer's transaction history data and a customer's current incentive indicia are stored in particular locations in a memory of a portable, machine-readable smart card. The smart card is adapted to interface with a store's check-out terminals and customer assistance, or kiosk terminals. Check-out terminals record a customer's most recent transactions in the customer's transaction history storage area and update a customer's current incentive indicia to reflect the most recent purchase.

From US 6,000,608 a loyalty card is known having an identification number comprising a bank identification number which assists in establishing communications links. The card system can be accessed from any existing point-of-sale (POS) device. The POS device treats the card as a credit or debit card and routes transaction data to a processing hub using the banking system. The processing hub coordinates the various databases corresponding to the various functions of the card.

US 6,009,415 shows a data processing technique for scoring bank customer relationships and awarding incentive rewards. Such Relationships may include deposit accounts, loan accounts, and customer referrals. Customer data describing the Relationship between the Bank and its customers is furnished by the customers and extracted from a Bank customer information file. Incentive Rewards, such as reduced loan rates or increased

**A method, computer system and computer program product for  
processing customer loyalty data**

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**Field of the invention**

The present invention relates generally to data processing of customer loyalty data and, more particularly, to a distributed computer system having a point-of-sale terminal at the front-end for capturing customer data.

**Background of the invention**

So called customer loyalty systems play an increasingly important role in all areas of marketing and business, such as the sale of goods and services to end consumers. Examples include customer loyalty systems of airlines, such as the "miles and more" program of Lufthansa. Other bonus systems exist for virtually any kind of goods and services; such bonus systems typically provide rebates or gifts to customers once a certain threshold of bonus points has been surpassed. For a comprehensive review of customer loyalty systems refer to: Butscher, S.A. (1998): Customer Clubs and Loyalty, Programmers: A practical guide. Gower; Datamonitor (1998): Customer Loyalty Technologies in European Retail. A Marketing Study.

From 6,119,933 a method for customer loyalty and marketing analysis is known. The customer frequency, analysis and reward system has multiple alternative components and allows for input of customer identification through use of a smart card, biometric input device, or a preexisting identification, such as a credit card, government-issued id, or checking account. A customer interacts with the system initially at a data collection point-of-sale (POS) device at a retail outlet. Data